Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: December 2007

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of December, 2007, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of December was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations C-2, S-64, S-49, S-42, and S-21 was 15.5 mS/cm during December 2007. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

Outflow for December 2007 was low this time of year. The range was between 3,000 cfs and 10,000 cfs for most of the month with two short periods of increased outflow between December 8 and 12 and December 20 and 25, where outflow peaked to about 11,400 cfs and 17,000 cfs, respectively, as a result of runoffs from precipitation events. Thereafter, outflow dropped sharply and remained below 4,000 cfs and 8,000 cfs after December 12 and December 25, respectively. Towards the end of the month, smaller precipitation events occurred and resulted outflow to increase to about 9,000 cfs and remained at that level for the remainder of the month. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December 2007 is listed below:

Month	Mean NDOI (cubic feet per second)
December	7,465

2.3 Rainfall

December 2007 was dry. There were several precipitation events during December, but all were small amounts. A few rainfalls occurred in early half, some in mid-December and small amount at the end of month. The largest precipitation event in December occurred on December 7, with a daily total of 1.32 inches. The monthly total is shown below:

Month	Total Rainfall (inches)
December	4.35

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during December 2007 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
December 1 – 16	3 gates **tidally operated**	In	Open-24/7
December 17 - 31	3 gates **held open**	In	Open-24/7

Gate operations continued into mid-December and ceased on December 17, with flashboards installed and boat lock gates open, except for boat passage only. Salinity levels in mid-December were under control and well within the monthly standard that DWR decided to cease radial gate operations and put them into an open position on December 17 in an effort to meet the 1994 NMFS Biological Opinion which required DWR to facilitate the passage of the endangered Sacramento River winter-run Chinook salmon. DWR will continue to monitor and re-operate the gates, if needed, to control salinity.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During December 2007 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), and Volanti(S-42) ranged between 7.0 mS/cm and 17.0 mS/cm as shown in Figure 1. Salinity levels started off at 16.5 mS/cm at Volanti and 16.0 mS/cm at Beldons, but dropped with the first set of precipitation events that occurred in second week of December. Collinsville started off at 8.0 mS/cm and inched upward slowly, but also inch downward slowly after the first set of rainfall in early December and remained stable at about 8.0 mS/cm for the remainder of the month. National Steel salinity pattern were similar to that of Collinsville, but started off the month slightly lower than 8.0 mS/cm and ended the month slightly higher than 8.0 mS/cm.

Overall, salinity levels in December 2007 were below the monthly standard. By mid-December, salinity levels were under control at all the compliance stations, which led DWR to ceased gate operation in an effort to meet NMFS Biological Opinion. This action would allow more fish passage, while not compromising salinity at the time.

S-21 (Sunrise Club) continues to be out of service since late December 2005 due to flooded event, thus S-21 station will not be reported in future reports until further notice. To date, on going repair work is being done at S21 site. S42 will continue to be the surrogate reporting station for the 2007-2008 control season.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for December 2007 were compared with means for those months during the previous nine years (Figure 4).

Mean salinity pattern of all compliance and monitoring stations resembles that of 2004, but at a higher magnitude. Compared to previous nine years, December 2007 salinity levels were ranked second in high Specific Conductance, thus making it the month with the ninth lowest salinity levels. Unlike the past nine years, higher salinity is observed at most of the compliance stations for December 2007 as shown in Figure 4, and is probably a result of delay gate operations in support of fish passage. Thus, allowing more salinity intrusion but salinity standards will not be compromised in the overall operational scheme.

Table 1

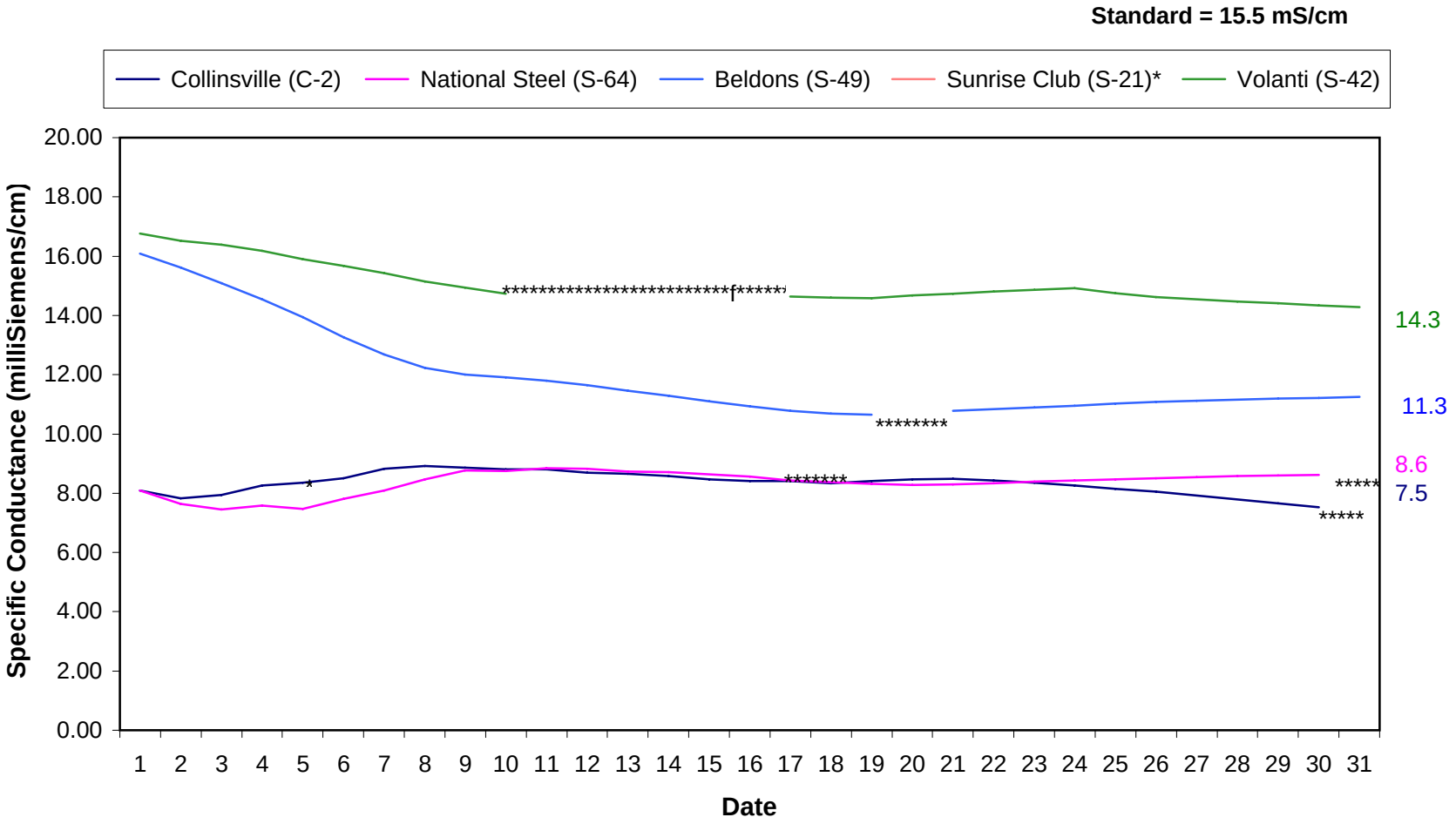
Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations

December 2007

Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	7.5	15.5	Yes
S-64	8.6	15.5	Yes
S-49	11.3	15.5	Yes
S-42	14.3	15.5	Yes
S-21***	n/a	n/a	n/a

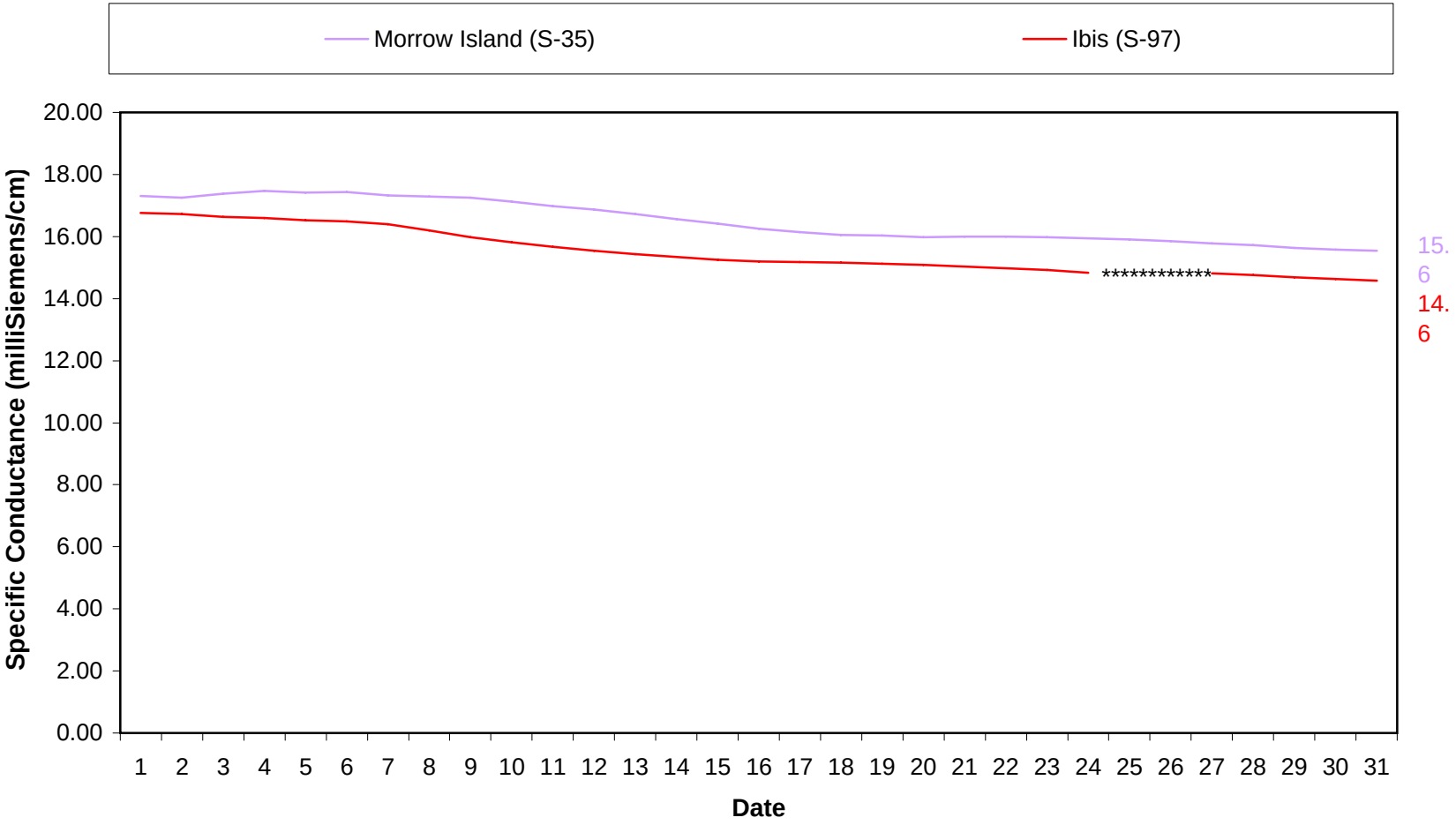
*milliSiemens per centimeter
**The representative data from nearby USBR station is used in lieu of data from station C-2.
***station is temporarily out of service. S42 is a surrogate station for S21 during the 2007-2008 control season.

Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2007



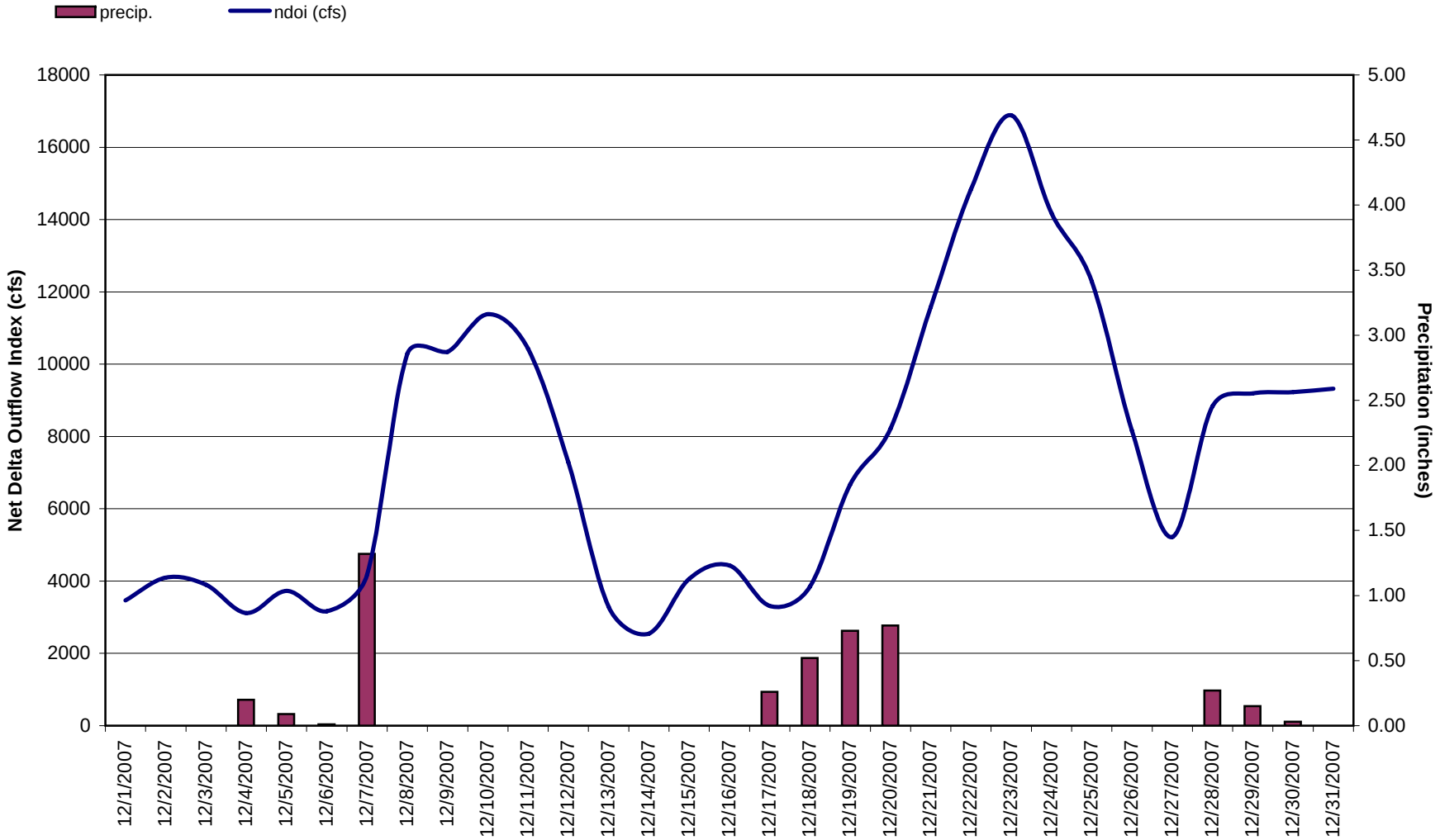
*S21 station remains out of service.
*** C-2. S-64. S49, and S42 data missing due to equipment problem.

Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2007



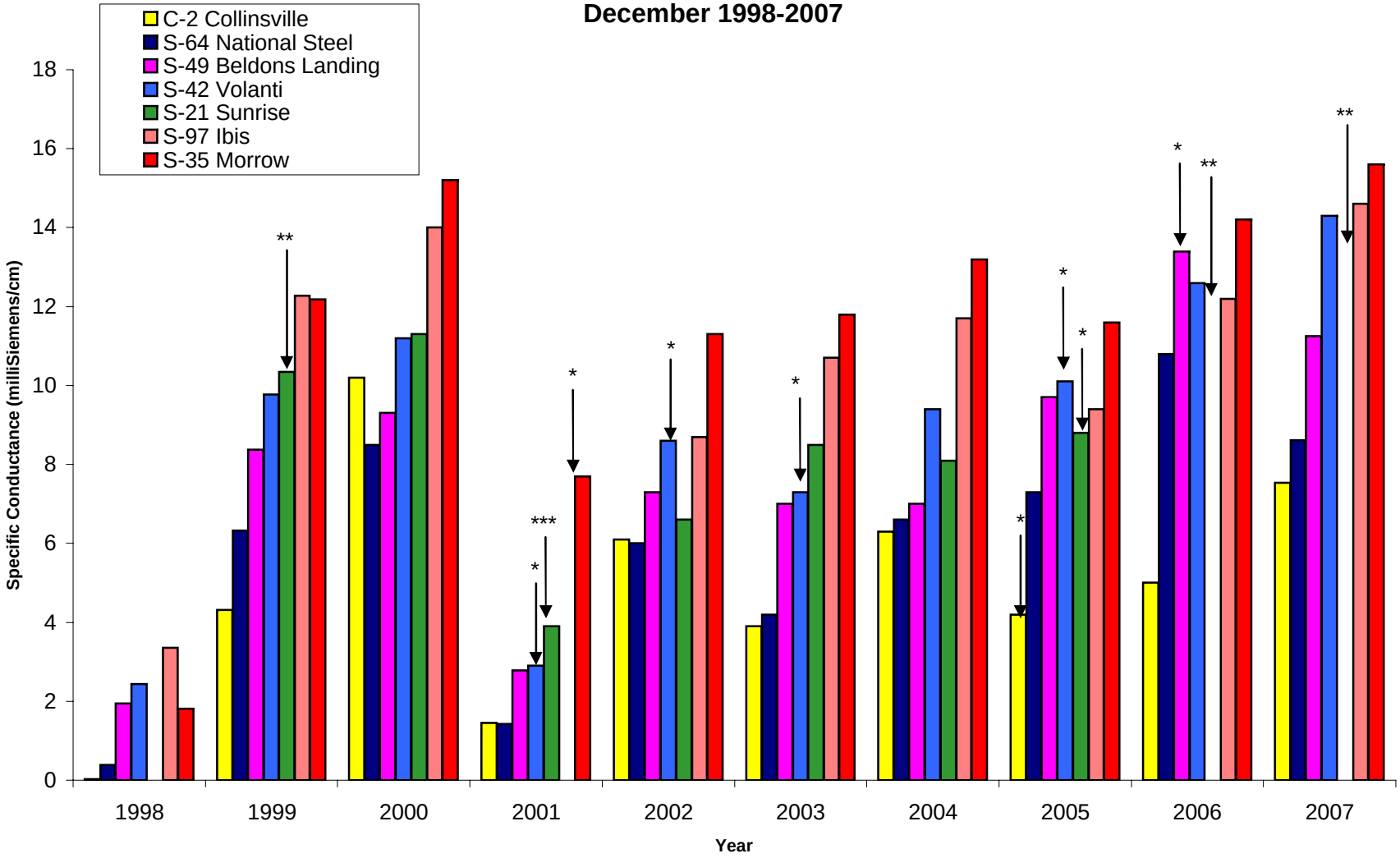
***** C-2. S-64. S49, and S42 data missing due to equipment problem.

Figure 3. Daily Net Delta Outflow Index and Precipitation*
December 2007



*Preliminary DWR, O&M Net Delta Outflow Index data and precipitation from Fairfield Water Treatment Plant.

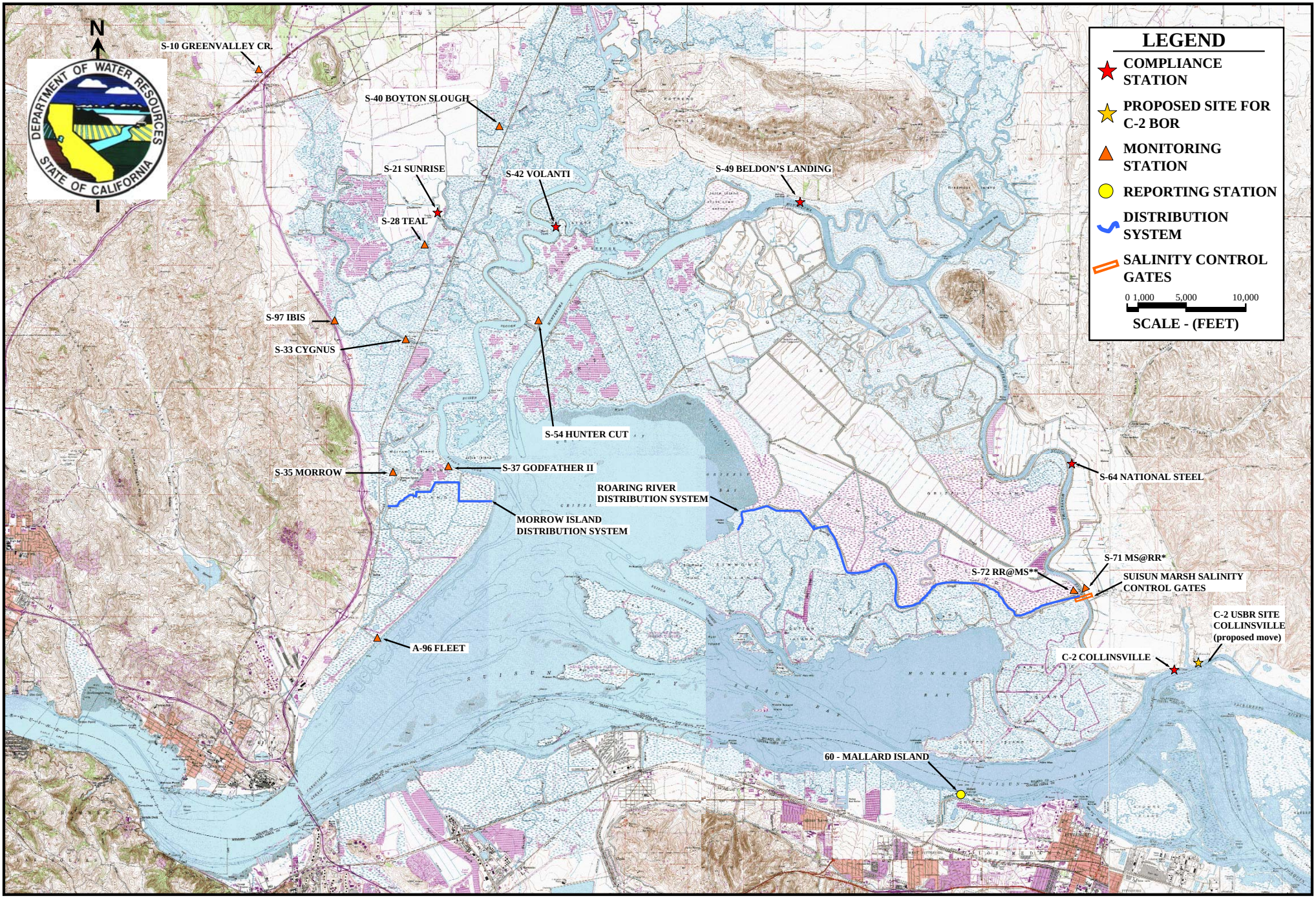
Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations December 1998-2007



* Data does not reflect partial month. Data collection was interrupted before the end of the month due to equipment failure.

** Data was not obtained due to power problems at the station.

*** Data was not obtained due to equipment failure.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES